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RECENT CHANGES IN SOME RHODODENDRON COLONIES IN MAINE AND NEW HAMPSHIRE

A. R. HODGDON AND RADCLIFFE PIKE

That *Rhododendron maximum* leads a precarious existence in its few and scattered stations in northern and central New England is so evident that it does not need to be reaffirmed here. Changes in the environment might be expected therefore to exert a considerable effect on the species. The purpose of this paper is to document these effects in a number of colonies which we have had under observation during recent years and particularly to point out the extreme sensitivity of *Rhododendron* to certain kinds of disturbance. At the outset we can state that, of the many instances of decline of *Rhododendron* stands that have come to our attention, not one in either Maine or New Hampshire can be attributed mainly to *direct* despoliation by man.

R. maximum lends itself uniquely to a study involving a recording of the areal extent of stands because, being singularly unusual in appearance as well as uncommon, it has attracted much attention and comment since comparatively early times. Also the fact that it occurs by itself, dominating its habitat makes it easy and tempting to estimate the size of colony. Thus there are many statements in the literature giving the sizes of stands when first reported and often we have found local inhabitants familiar with the colonies that we have visited, well prepared in most instances to tell us the acreage of the colony at some earlier time. Of course it is not safe to rely too precisely on such data, but trends

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are certainly indicated that are borne out by our own observations during successive visits or by reports in the literature.

Fluctuations in colony at Lexington, Maine. — F. H. Cowan¹ reporting in 1899 that this colony covered "over half an acre" made the additional comment "It is said that as early as 1845, one Nathan Safford, who lived near the pond, found these strange flowers and that, at that time, only a few square rods were covered by the plants." Mr. C. H. Knowlton visited the colony on August 20, 1949 and reported² as follows: "The shrub was discovered in 1845 by one Nathan Safford who lived nearby and the stand has spread from a few square rods to nearly two acres. About a quarter of this area is now full of dead shrubs, perhaps due to change in water-level."

We have visited this area on two occasions the earlier in November 1951 the more recent on July 19, 1954. In 1951 it seemed to us that the colony was vigorous and showed no more striking signs of deterioration, except in size, than were apparent to Knowlton two years before. By pacing, we calculated the stand to be about 200 feet long by 150 feet wide, the area thus to be about three quarters of an acre. Some of the difference in size as noted by Knowlton and ourselves may be due to errors in estimation but some undoubtedly may be laid to the killing off of plants at the periphery of the colony. In 1954 the stand was reduced in size to much less than half of its 1951 size. The undoubted agents of destruction were deer which apparently have yarded in the area and had nipped off since 1951 an estimated one-half to two-thirds of the shoots around the colony, leaving untouched, at that time, only a small part of the stand at its center. Earlier nipping by deer occurred at heights of about 3-4 feet, the probable depth of snow in midwinter. More recent foraging had taken place on stems about a foot high. In either case virtually all stems thus mutilated lost all of their foliage and subsequently died leaving considerable areas of naked dead stems where luxuriant growth was

¹ Cowan, F. H. *Rhododendron maximum* in Somerset County, Maine. *Rhodora* 1: 55, March 1899.

² Knowlton, C. H. *Rhododendron maximum* in New England, *Rhodora* 52: 215-218, Sept. 1950.

present in 1951. This attractiveness of rhododendrons for deer has been shown in other areas.^{3,4} We noted in 1954 considerable reproduction by seedlings among the living and dead plants which shows that the colony could perpetuate itself once the deer cease their depredations.

Sanford, Maine colony. — Knowlton loc. cit. p. 216 wrote "three acres are covered" by the rhododendrons. It is not certain where or when he obtained this information. But as a result of several visits in recent years, the first on July 7, 1955, we estimate the total area covered by both dense growth and scattered plants as something like five acres. Considerable reproduction of seedlings was noted particularly at the edge of the colony on the east where new plants were filling in between older clumps and the entire colony was expanding its area somewhat. The colony at present lies almost entirely on a slope to the north of which is a swamp or wet sedge-meadow which seems to be developing into a red maple swamp. Some rhododendron seedlings in recent years are appearing beyond the parent plants at the edge of the swamp.

While of a less spectacular nature than at Lexington, Maine, the change in extent of coverage of the Sanford, Maine colony is mentioned here to show that rhododendron stands can spread when environmental conditions are suitable.

Albany, New Hampshire colony at Bald Hill. — This small but well known stand was first reported by St. John⁵ in 1916 who wrote of it as follows: "the trees fifteen feet in height made a solid stand over an acre of ground." In 1938 the late Mr. Elmer Littlefield of Conway, who at that time owned land near the rhododendron tract guided the senior author into the area. On April 3, 1954 Messrs. Frederic Steele and Alexander Lincoln, Jr., visited the colony and recorded their observations and on November 15, 1955 the present authors visited the tract to obtain seeds and to note the condition

³ Forbes, E. B. and S. I. Bechdel, Mountain laurel and Rhododendron as foods for white-tailed deer. *Ecol.* 12:328, 1930.

⁴ Forbes, E. B. and L. O. Overholts, Deer carrying capacity of Pennsylvania woodland. *Ecol.* 12:750, 1931.

⁵ St. John, Harold. Additional notes on Rhododendron maximum in New Hampshire. *Rhodora* 18:73-74, April, 1916.

of the stand. The senior author's impression from the 1938 visit is of an extensive and lush growth of rhododendrons in a fairly open forest of mixed conifers and hardwoods. Steele and Lincoln in their April 1954 notes (unpublished) comment on rhododendrons being stunted and in poor condition above the ledges and beneath the developing forest.

Our visit in November 15, 1955 showed the rhododendrons to have almost completely disappeared under the very dense blanketing growth about 15-20 feet high of dominant *Tsuga canadensis* with scattered trees of *Picea rubens*. Occasional weak plants still persisted under the conifers. The colony was reduced essentially to some straggling plants somewhat unevenly covering an area of ledge about 60 feet wide by 200 feet long. Here the rhododendrons were associated with deciduous trees chiefly and were reproducing satisfactorily by seedlings in 1955. The reduction of this colony to about one-third of its earlier size resulted from the removal of the bigger trees from much of the stand. The plants here have suffered first from their complete exposure by cutting or removal of protecting trees, and subsequently by their being shaded out by overtopping conifers.

Pittsfield, New Hampshire colony. — On two occasions we have searched in vain for a small stand of rhododendrons in Pittsfield, about three-quarters of a mile northwest of the well known station at Adams Pond. On each occasion we had a different guide who was not aware of the other's interest in the plant. Both moreover were familiar with the plants at Adams Pond and both led us to the same locality — an area of recently cut-over woods covered with slash. The removal of protecting trees and the piling up of slash, the two most obvious disturbances from lumbering operations have caused the complete destruction of this rhododendron colony.

Manchester, New Hampshire colonies. — Most extraordinary changes have occurred to two stands of rhododendron in Manchester. We are indebted to Dr. Maurice Provost, now of Vero Beach, Florida, for the description of a colony which he discovered along Millstone brook. From his journal-account written at the time of his discovery on April 26, 1935, we quote the following, "all along the brook, for near-

ly one-quarter mile it formed a dense thicket which in places rose to almost 20 feet above the boggy ground." By following his directions which were most explicitly given in the journal, the senior author, on September 26, 1955, found the locality with little trouble. But the stand had shrunk in the interim to a few scattered meagre patches none over 7 or 8 feet in height. The area where the plants once grew so luxuriantly is now drier and more densely wooded than it was in 1935. These trees in 1955 were young, the indication being that there has been a drastic change in the associated forest since 1935.

Two reports from the last century allude to the presence in Manchester of a very large area occupied by rhododendrons. Wm. E. Moore in 1897⁶ made the following comment, "About 2 miles northwest of Amoskeag Falls, lying to the east of and near the Valley of Black Brook is a great thicket covering from 60-80 acres and known as Rhododendron or Cedar Swamp." This without question is the place that Frederick W. Batchelder wrote about in 1899⁷ as follows: "A high, wet swamp, difficult of access, near the northwest corner of Manchester, has long been known as a station of the beautiful 'rosebay'. The plants are usually in flower about July 4th. The swamp having recently been denuded of its trees the rhododendrons have not flowered as well as formerly, and after very cold winters the buds are mostly blighted."

On April 20, 1954 we visited the remnant of this stand guided by Mr. James Proctor, who lived nearby. The rhododendrons now are nearly confined to the swamp-border where the plants cover not more than 2 acres. Only occasional and very scattered plants could be seen in the swamp itself. The forest has developed very slowly during the approximately 60 years since the swamp was cleared. The occurrence of scattered rhododendrons in the swamp in 1955 indicates that with the improvement of conditions it again may become filled with the shrub.

⁶ Moore, Wm. E. Contributions to the History of Derryfield, 35, 1897.

⁷ Batchelder, F. W. Preliminary list of plants in the vicinity of Manchester, New Hampshire in Proceedings of Manchester Institute of Arts and Sciences 1: pp. 110-111, 1899.

Hopkinton Colony. — We visited this small stand on June 2, 1959. The owner Frank Kimball, told us at that time that the plants had diminished greatly after the protecting forest trees had been cut off about 65 years before. With regrowth of suitable species including *Tsuga canadensis*, *Betula lutea*, *Fagus grandifolia* and *Acer rubrum* in the immediate vicinity this colony has regained its earlier size. The colony is not now reproducing by seedlings perhaps because the plants have so recently reached maturity and also possibly because the composition of the forest adjacent to the stand is not yet favorable for the growth of seedlings.

Richmond rhododendrons. — This colony, one of the earliest known in New Hampshire, had not been observed except by local residents for many years until it was rediscovered by Mr. Tudor Richards, the County Forester of Cheshire and Sullivan Counties. On May 19, 1956 we visited this stand which now consists only of scattered clumps growing over about 1½ acres of swampy forest land. Mr. M. Martin Fay the present owner told us that the rhododendrons originally covered about 7-8 acres, the growth being very luxuriant about 65 years ago, at which time the area was cut over without any concern for the rosebay. The rhododendrons as a result almost entirely disappeared. Presumably this explains why the Richmond colony that once was as well known as the famous stand in Fitzwilliam, became quite forgotten.

It is unfortunate that *R. maximum* is so sensitive to any marked disturbance of the forest trees with which it is commonly associated. Its effective conservation obviously depends on maintaining a mixed forest of mature or fairly mature trees to permit (1) some protection of larger rhododendron plants from excessive sunlight as well as over shading, (2) to provide suitable edaphic conditions throughout the year and (3) to make conditions right for seed germination and seedling growth.

It is reassuring that some colonies, like that in Sanford, Maine, have held their own or even improved in recent years. It is perhaps significant that many of our colonies are so situated that when conditions become intolerable in the swamp the plants can still survive on the better drained

swamp-border, the converse also being true when the conditions are reversed.

There is also some possibility that colonies of *R. maximum* may spread and then contract in a natural way in response to such factors as aging of the individuals that make up a stand or perhaps in response to climatic changes.—
DEPARTMENT OF BOTANY AND DEPARTMENT OF HORTICULTURE,
UNIVERSITY OF NEW HAMPSHIRE, DURHAM, NEW HAMPSHIRE.

NEW AND INTERESTING VASCULAR PLANT RECORDS FROM KANSAS

RONALD L. MCGREGOR

Intensive field studies in Kansas have resulted in the finding of eight species previously unreported for the State and new collection records for nine of the rarer species. Specimens are on file in the Herbarium, The University of Kansas.

SPECIES NEW TO KANSAS

Hilaria jamesii (Torr.) Benth. This species is not recorded for Kansas in any manual or State list. It may now be listed for southwestern Kansas with data as follows: Common on sandy soil in the Cimarron River valley, 8 miles north of Elkhart, Morton County, July 9, 1958, *McGregor 13981*.

Eleocharis atropurpurea (Retz.) J. & C. Presl. Found in large quantities on the margin of shallow ponds in the sand dunes north of Burrton, Harvey County, June 25, 1959, *McGregor 14531*. The species was associated with strand plants of *Marsilea mucronata* A. Br.

Holosteum umbellatum L. This naturalized species has become somewhat frequent in central and southcentral Kansas. It is now known from Mitchell, Rice, Reno, Kingman, Pratt, and Barber counties where it is found, during April, on sandy soils of lawns, fields, and roadside banks. Specific data on a representative collection is as follows: one mile east of Kingman, Kingman County, sandy field, April 26, 1959, *McGregor 14204*.

Chorispora tenella (Willd.) D C. The first record of this adventive species was a fragmentary specimen sent to me from Rice County in 1947. It has since been found in Chautauqua, Butler, Harvey, Riley and Rice counties. It has been found only in lawns, near feed lots and roadside banks. A representative collection is as follows: roadside bank, ½ mile south of Lyons, Rice County, April 24, 1959, *McGregor 14173*.

Vicia ludoviciana Nutt. Frequent on red gypsum soil prairies, seven miles west of Medicine Lodge, Barber County, May 28, 1957, *McGregor, 12863*. Plants occur as scattered individuals on prairie hillsides and in ravines.

Vicia dasycarpa Ten. This naturalized species is another Kansas record from the small Ozarkian area in the extreme southeastern corner of the state. The data are as follows: rocky hillside, four miles east of Baxter Springs, Cherokee County, June 9, 1957, E. W. Lathrop 3737.

Ammoselinum popei T. & G. This species has been reported from Kansas on the basis of a specimen in NY bearing the notation of "southwestern Kansas". It is now known from Kansas as follows: dry gypsum flats, seven miles south of Lake City, Barber County, May 9, 1959, McGregor 14251.

Mimulus glabratus H. B. K., var. *oklahomensis* Fassett. On sandy flat of small clear stream at Elm Mills, Barber County, April 24, 1959, McGregor 14174. At a similar location just one mile west was collected *Mimulus glabratus* H. B. K., var. *fremontii* (Benth.) Grant. This is the variety of the species found over most of western Kansas.

INFREQUENTLY COLLECTED PLANTS

Danthonia spicata (L.) Beauv. Previously reported only from the extreme southeastern corner of Kansas the species has been found to be common in the Chautauqua Hills area some ninety miles westward. Data is as follows: Open areas in scrub-oak hillsides, sandy soil, five miles east of Toronto, Woodson County, June 5, 1955, Lathrop 636.

Gymnopogon ambiguus (Michx.) B. S. P. Included in the Kansas flora on the basis of an old specimen from Chautauqua County with uncertain data. A recent collection is as follows: Ravine, sandstone canyon, three miles northeast of Sedan, Chautauqua County, August 19, 1959, McGregor 15048. The species was abundant in local areas.

Panicum perlustum Scribn. Formerly known from three counties in central part of the state the species is now known from east-central Kansas as follows: Common in rocky, big bluestem prairie, two miles northeast of Welda, Anderson County, June 8, 1956, McGregor 12319.

Juncus scirpoides Lam. Has been known only from the salt marsh area in Stafford County. The species is rather frequent on salty flats in the Medicine River valley of Barber County. A representative collection is as follows: Salt flat along Medicine River, eight miles south of Medicine Lodge, July 11, 1958, McGregor 14070.

Spiranthes gracilis (Bigel.) Beck. This species has been listed for Kansas from Cloud County. The specimen, however, is *S. lucida* (H. H. Eat.) Ames. Recent collections of *S. gracilis* have been made by the author from Bourbon, Chautauqua, Cherokee, Douglas, Franklin, Neosho and Woodson counties.

Salicornia rubra A. Nels. This species has been known in the state on the basis of an old collection made in Stafford County. It has been rediscovered with data as follows: barren salt plain, Great Salt Marsh, Stafford County, September 2, 1959, McGregor 15193. A few hundred plants were found in a localized area in the marsh and were associated with *Sesuvium verrucosum* Raf. and *Suaeda depressa* (Pursh) S. Wats.

Sesuvium verrucosum Raf. This species has been included in the

States flora on the basis of an old collection from Ford County. It has been found to be frequent on saline areas in Barber, Rice and Stafford Counties. A representative collection is: Common on saline plain, 1½ miles southeast of Hazelton, Barber County, July 28, 1959, *McGregor 14589*.

Mimosa borealis Gray. Known previously in Kansas only from Meade County it has now been located 85 miles east as follows: Gypsum Hills prairie, rocky hillside, five miles south and two miles east of Lake City, Barber County, June 24, 1959, *McGregor 14479*. Sixty-three of these shrubby plants were counted in the area.

Dalea compacta Spreng. From sand hill prairies, valley of Cimarron River, eight miles north of Elkhart, Morton County, July 9, 1958, *McGregor 13971*. Known previously only from Grant and Stevens counties. Some specimens from the Morton County colony had spikes 25 cm. long as compared with the usual descriptions of up to 15 cm. in length. — DEPT. OF BOTANY, UNIVERSITY OF KANSAS, LAWRENCE.

ELEOCHARIS ACICULARIS IN ACID MINE DRAINAGE

ELWOOD B. EHRLE

During a recent floristic study (Ehrle, 1958) the paucity of aquatic vegetation was noted as a characteristic of the flora of the eastern edge of the Allegheny Plateau in Central Pennsylvania. The waters of this area pass over and through strip mines and naturally exposed coal seams in their course to the streams forming the major pattern in the drainage basin of the West Branch of the Susquehanna River.

Leighton (1904) gave the following general description of streams polluted by acid mine drainage: "The appearance of a small stream into which coal-mine waters are discharged is peculiar. The bottom of the channel is colored a light yellow and there appear no signs of vegetation of any kind. All fish life in the stream is immediately destroyed at the first appearance of coal mine wastes." This description is incomplete only in omitting mention of the abundant mats of *Eleocharis acicularis* (L.) R. & S. in the more shallow portions of many such streams.

The records obtained by Love (1954) from the West Branch of the Susquehanna River, two miles downstream from Lock Haven (Clinton County, Pa.), are instructive in

demonstrating the pH conditions that prevail in the drainage basin under consideration. In 36 samples collected from this location between October, 1945 and September, 1950, the pH ranged from a low of 3.05 to a high of 4.6. Unpublished records of the Pennsylvania Fish Commission (Table I) illustrate the frequency of acid mine drainage and its effect on stream acidity.

Table I. The recorded pH of some of the streams of Clearfield County, Pa. Streams polluted with acid mine drainage are designated by the letters AMD following the pH value.

Stream	Tributary of	Date	pH
Mountain Run	Bennett's Branch	2- 5-58	5.0 AMD
Little Clearfield Creek	Clearfield Creek	3-21-56	7.2
Trout Run	W. Br. Susquehanna R.	3-21-56	6.8
Montgomery Run	Anderson Creek	5-17-56	4.4
W. Br. Susquehanna River	Susquehanna River	4-18-57	4.8 AMD
Sinnemahoning Cr. Bennett's Br.	Sinnemahoning Cr.	7-23-47	3.2 AMD
Cush Cushion Cr.	W. Br. Susquehanna R.	7-28-48	7.9
Deer Run	W. Br. Susquehanna R.	7-29-47	4.2 AMD
Horn Shanty Run	W. Br. Susquehanna R.	9- 5-51	6.3
LaBorde Run	Sandy Lick Creek	3- 5-57	4.6 AMD
Montgomery Cr.	W. Br. Susquehanna R.	9- 5-51	5.2 AMD
Little Muddy Cr.	Muddy Creek	7-25-47	3.0 AMD
Pine Creek	Clearfield Creek	9-25-56	5.8 AMD
Shryock Run	W. Br. Susquehanna R.	7-22-48	4.5 AMD

The data presented and the drainage conditions discussed in this paper account for: (1) the observation of a yellowish residue on rocks in many of the stream channels of the area, and (2) the rarity of aquatic vegetation. Only one aquatic species, *E. acicularis*, has been found to be present in most of these streams. It appears to thrive forming large, bright green, usually vegetative mats. In some cases the mats are extensive enough to form a semi-continuous cover over the stream bottom.

Other aquatics have not become established in the acid mine drainage of this area. The success of *E. acicularis* in such a situation is not alluded to in the habitat description "muddy shores" of Gleason (1952) or "damp shores and low grounds" of Fernald (1950). *E. acicularis* does occur in

damp to wet places as a semi-aquatic, but it also occurs as a true aquatic under the conditions described. —STATE UNIVERSITY COLLEGE OF EDUCATION AT GENESEO, N. Y.

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UNPUBLISHED RECORDS — Pennsylvania Fish Commission, Bellefonte Office. By Permission.

REVISION OF HETEROTHECA, SECTION HETEROTHECA (COMPOSITAE)

BURDETTE L. WAGENKNECHT

(Concluded)

DISTRIBUTION AND HABITATS: Northwestern Arizona to Sonora and Chihuahua, Mexico and Great Bend National Park, Texas. Sandy soil along small occasional streams, roadside ditches, waste places, in valleys at altitudes of 1,000 to 4,500 feet.

This species is most closely related to *Heterotheca latifolia* Buckl., from which it differs in the more robust habit, the elongate peduncles and the more glandular phyllaries. Specimens placed in this species have at various times been identified as *H. inuloides*, *H. leptoglossa*, *H. grandiflora* and *H. subaxillaris* (sensu *H. latifolia*).

The specific epithet refers to the habitat preference of this species. Apparently undisturbed silt and gravel soils are not colonized by it.

Representative specimens. **Texas:** Brewster Co.: Santa Helena Canyon, Big Bend National Park, *Moore and Steyermark* 3467 (GH, PH, UC). **Arizona:** Cochise Co.: 8 mi. e. Pearce, *Wagenknecht* 4880 (KANU); Graham Co.: 16 mi. s. Safford, *Gould & Haskell* 3984 (CU); Pima Co.: 8 mi. n. w. Tucson, *Wagenknecht* 4849 (KANU); Pinal Co.: 3 mi. n. w. Coolidge, *Wiggins & Rollins* 481 (NY); Yavapai Co.: 10 mi. s. Prescott, *Gillespie* 8532 (GH, UC). **MEXICO:** Chihuahua: Chihuahua, *Pringle* 674 (GH, NY, PH, US), Camargo, *White* 2289 (GH).

7. *H. latifolia* Buckley, Proc. Acad. Nat. Sci. Phila. 13: 459. 1862

Annual or biennial aromatic herbs 0.5-2 m. (spring form 10-50 cm.) tall, the branching limited to the upper one-third to one-half of stem. Stem striate, velutinous, the velutinous indumentum becoming progressively dense below with spreading hairs up to 4.2 mm. long. Leaves alternate, ovate to elliptical or lanceolate, entire, dentate or serrate, sparsely pilose above, pilose below, the veins prominently raised. Lower leaves 1-7 cm. long, 0.5-4 cm. wide, petiolate (spring form with basal and caudine leaves prominently so), the petioles 1-2.5 cm. long with enlarged auriculate-clasping bases. Caudine leaves 0.3-2.4 cm. wide, 1-3 cm. long, becoming progressively smaller upward, sessile or partly clasping, sparsely toothed to entire. Inflorescence a loosely spreading or divaricate corymbose panicle; terminal involucres 0.8-1.8 cm. (spring form 0.4-0.9 cm.) wide, 4-8 mm. high, campanulate to hemispherical. Phyllaries in 4-6 series, the tips villous, the inner series 4-9 mm. long, glabrous on both surfaces, the margins scarious, the outer series 0.7-2.5 mm. long, sparsely strigose on outer surface and with sessile to capitate glands. Ray flowers 15-35, (spring form 6-25), the corolla tube 2-4 mm. long, the ligules 3-5 mm. long; disk flowers 25-40 (spring form 6-25), the tube 2-3 mm. long. Ray achenes 1.5-3.0 mm. long, trigonous, epappose, glabrous or bearing a few silky hairs on the angles. Disk achenes 2.2-3.2 mm. long, obovate, compressed, densely sericeous. Pappus of two series, the inner series of numerous barbellate bristles, 3.4-6.2 mm. long, reddish brown to white, the outer series squamellate-setaceous or of short barbellate bristles 0.3-0.6 mm. long. Receptacle flat, white, alvelolate, the partitions irregularly terminated by unequal chartaceous points.

Heterotheca latifolia was described by Buckley (1861). Gray (1862) after examining the type specimen dismissed the species with the statement, "*Heterotheca latifolia* is *Heterotheca chrysopsisidis*." It is interesting that both Buckley's description and Gray's statement were ignored thereafter by authors dealing with this species in various floristic studies. Authors who dealt with this species usually identified it as *H. lamarckii* Cass. as distinguished from the scabrous *H. scabra* (Pursh) DC., which is found along the coasts. Britton and Rusby's transfer of Lamarck's species name to *Heterotheca* was presented in a paper which dealt with a specimen of *H. latifolia* Buckl. and had the result of linking the name *H. subaxillaris* (Lam.) Britton & Rusby to both species. As a result, *H. latifolia* was regarded by all authors as conspecific with *H. subaxillaris*.

The first person to express doubt as to the validity of the above treatment was Harper (1944). He said of *Heterotheca subaxillaris* as delimited at that time, "A variable species,

perhaps divisible into more than one. A prostrate form seems to be native on drifting sands on Dauphin Island, and Dr. Mohr reported it also from similar places in Baldwin County. Taller forms are occasionally seen in sandy waste places in the coastal plain and in recent years one has been quite abundant in and around railroad yards in Birmingham." An examination of his collections reveals that the prostrate form was *H. subaxillaris* var. *procumbens* and the taller forms were *H. latifolia* var. *latifolia*.

Shinners (1951) examined the type specimen of *Heterotheca latifolia* in the Herbarium of the Academy of Natural Sciences in Philadelphia and found it to be identical with the common old-field or waste-ground weed of central and eastern Texas.

Keever (1955), studying succession in abandoned fields of the southeastern states, found that *Erigeron canadensis* L. [*Conyza canadensis* (L.) Conq.], a first-year dominant, was being replaced by a species of *Heterotheca* which was unknown to her. Miss Keever was familiar with *H. subaxillaris* of the coastal areas and was not satisfied with an identification which placed her specimens in this species. Material sent to Dr. Shinners was identified as *H. latifolia*. Keever's investigation established the years 1945-46 as the approximate date of introduction of this species to the Piedmont of Georgia and the Carolinas. The source of these colonies is not given. No positive means of invasion has been definitely established, although the number of labels citing railroad yards as habitats in Mississippi and Alabama would indicate one possible avenue.

The earliest collection of *Heterotheca latifolia* made in Delaware was by Canby (1887). This plant has been misidentified as *H. subaxillaris*. An examination of cited specimens shows that both species occur in Delaware. Tannall's (1946) comments on *H. subaxillaris* are of interest. The habitat description, "Common weed in dry pastures and on roadsides" could apply to either species in this locality, while a further statement, "An introduction from the southern states, spreading rapidly northward," appears to fit more closely the behavior pattern of *H. latifolia*. An ex-

amination of Tatnall 4902, identified as *H. subaxillaris*, shows it to be *H. latifolia*. Uttal (1954) reported *H. subaxillaris* on Long Island, but an examination of this specimen shows it to be *H. latifolia*. Uttal postulated the source of the colony as a weed in grass and sod brought to the area from Delaware. From the presence of the species in Delaware as indicated above, one would tend to agree with this theory.

Of interest is the recent invasion of Illinois by this species. Collections from Missouri include the following: Eggert, Pine Bluff (1896), Bush, Randolph (1927), and Steyermark, several collections in southern and eastern Missouri during the middle 1940's. During this period no collections were reported from Illinois, Dobbs (1946) reported the first Illinois collection as follows: "Another plant of very recent introduction in Illinois is *Heterotheca subaxillaris* (Lam.) Britt. & Rusby. This species much resembles *Chrysopsis villosa* (Pursh) Nutt., a psammophilous plant of rather frequent occurrence in Henry County, but may be distinguished from it by the achenes of the ray and disk flowers which are quite dissimilar. It is nearly ubiquitous in the southern states and Mexico, and is spreading northward. On September 17, 1944, a few plants were found along railroad tracks near the village of Green River, and they were still persisting at the time of my last revisit which was on September 9, 1945. Although this region has been botanized rather frequently, no specimens were seen prior to the above dates. Deam does not report it for Indiana, and the writer has not heard of its occurrence elsewhere in Illinois. More time will be needed to determine its exact status in Illinois." Dobbs (1952) is a report of the same record. Bailey (1949) did not include the species in his report. Jones and Fuller (1955) reported, in addition to the Henry County station, a collection from Union County, the latter falling within the area covered by Bailey's paper. Private correspondence with Professor R. H. Mohlenbrock, Southern Illinois University, Carbondale, reveals that a collection was made in Pulaski County, Mohlenbrock & Voigt 5896, on June 22, 1955. The specimen was not seen. The well-recorded in-

vasion shows the ability of this species to speedily occupy a new area.

At the southern limits of its range, occasional plants of the species are able to survive mild winters and flower again during the spring and early summer. The appearance of these individuals is quite different from the so-called normal plants which flower in the fall. The earlier the plant flowers, the more it differs from the fall-flowering members of the species. With experience one can estimate fairly accurately the season of collection of a specimen of *Heterotheca latifolia*, even without consulting the collection data. The spring forms are much shorter than the fall ones and become, in extreme cases, rosette forms with a short branching inflorescence; the flowers are smaller and may bear as few as six ray flowers and six disk flowers; all leaves below the inflorescence are characteristically petiolate and the petioles are dilated not at all or only slightly at the base. Benke (1928) described *H. subaxillaris* var. *petiolaris* from a specimen (Benke 4585 F) which he collected on March 12, 1928. This specimen was not studied, but others, cited as being "exactly of the same description", Hall 312, March 16, 1872, and Hays 399, Belknap, Texas, March 30, 1858, were seen. It is interesting to note that with regard to the time of year, these plants were collected within an eighteen day period. Two specimens, "which though somewhat similar do not quite agree with type" are Dixon 71, Huntsville, Texas, June 3-12, and Dixon 217, Riverside, Texas, June 19. These specimens approach more nearly the fall form. Since this variation is due to the time of year in which the plant is collected, var. *petiolaris* is considered here to be a synonym of *H. latifolia* var. *latifolia*.

7a. *H. latifolia* var. *latifolia*

Heterotheca subaxillaris (Lam.) Britt. & Rusby var. *petiolaris*
Benke. *Rhodora* 30: 201. 1928.

TIME OF FLOWERING: July to November in Oklahoma, northern Texas, New Jersey and Georgia; March-December in southern parts of range.

TYPE AND TYPE LOCALITY: Buckley, Llano County, Texas. (PH).

DISTRIBUTION AND HABITATS: native to Louisiana, Oklahoma, Texas and northern Mexico, introduced from New Jersey south to Georgia west to Alabama. Sandy or disturbed soils in open woods, roadsides, fields, waste ground and along railroads.

Representative specimens. **New Jersey:** Cape May Co.: *Brown* (GH). **Delaware:** Kent Co.: 1 mi. s. Choptank Mills, *Tatnall* 4902 (PH). **Maryland:** Talbot Co.: 1 mi. s. w. Easton, *Earle* 3715 (PH). **Virginia:** Princess Anne Co.: Cape Henry, *Egler* 40-245 (NY). **North Carolina:** Rutherford Co.: 3 mi. e. Forest City, *Channell* 2679 (SMU). **South Carolina:** Cherokee Co.: 3 mi. s. w. Gaffney, *Keever* (NY); Edgefield Co.: Clark Hill Dam, *Duncan* 9982 (SMU); Marion Co.: bank of Great Pee Dee River, *Leeds* 1902 (PH); Spartanburg Co.: 5 mi. w. Chesne, *Fox* 5252 (SMU). **Georgia:** Columbia Co.: *Duncan* 11779 (CU, OKLA, SMU); Houston Co.: Welston, *Ainsworth* 44912.5 (PH). **Alabama:** Elmore Co.: *Justice* 243 (CU). Greene Co.: 1.3 mi. n. e. Epes, *Shinners* 12717 (SMU); Jefferson Co.: Montgomery, *Harper* 3433 (GH, NY, PH, US); Sumter Co.: Sumterville, *Whitehouse* 24389 (SMU). **Mississippi:** Adams Co.: *Smith* 583 (US); Jefferson Co.: *McDougall* 1118 (US). **Missouri:** Stoddard Co.: 3.5 mi. s. w. Pyletown, *Steyermark* 66190 (F). **Arkansas:** Columbia Co.: *Magnolia*, *Demaree* 21779 (NY, UC); Desha Co.: Arkansas City, *Demaree* 27275 (SMU, TEX); Hempstead Co.: *Moore & Lee* 29 (TEX); Pulaski Co.: Arkansas River, *Demaree* 8631 (GH, US). **Louisiana:** Allen Parish: Oakdale, *Shinners* 22081 (SMU); Bossier Parish: 11.4 mi. e. n. e. Bossier City, *Shinners* 21746 (SMU); Caddo Parish: Fort Humug, *Correll & Correll* 10087 (GH, NY); Claiborne Parish: 1.4 mi. s. e. Gordon, *Shinners* 24560 (SMU); Natchitoches Parish: 2.2 mi. s. s. e. Natchitoches, *Shinners* 20007 (SMU); Rapides Parish: *Hale* (F). **Kansas:** Wyandotte Co.: Kansas City, *MacKenzie* (F). **Oklahoma:** Cleveland Co.: 10 mi. e. Norman, *Nelson, Nelson, & Hopkins* 781 (UC); Love Co.: 16 mi. e. Marietta, *Shinners* 12905 (SMU); McCurtain Co.: 1 mi. s. Torn, *Waterfall* 10467 (SMU); Marshall Co.: 0.5 mi. w. Uobs, *Riggs* (SMU); Mays Co.: *Stevens* 2583 (GH, NY, US); Murray Co.: Platt Nat. Park, *Merrill & Hagan* 1271 (F, NY); Oklahoma Co.: Oklahoma City, *White* 1141 (GH, SMU). **Texas:** Anderson Co.: 3.7 mi. n. Montalba, *Cory* 53905 (SMU); Angelina Co.: Lufkin, *Rhoades* 55 (CU); Arkansas Co.: Rockport, *Cory* 51221 (SMU); Bandera Co.: 10.3 mi. w. n. w. Bandera, *Shinners* 16881 (SMU); Bell Co.: 4 mi. w. Belton, *York & York* 53050 (SMU); Bexar Co.: Bandera Road, *Schultz* 314 (US); Brazos Co.: 3.7 mi. e. Kurten, *Cory* 50621 (SMU); Brooks Co.: King Ranch, Encino Division Headquarters, *Gould & Morrow* 6760 (SMU); Burnet Co.: 8 mi. w. Burnet, *Turner & Johnson* 2477 (TEX); Camp Co.: 1.7 mi. s. w. Newcome, *Shinners* 16275 (SMU); Colorado Co.: 5 mi. n. e. Columbus, *Shinners* 14614 (SMU); Comal Co.: Comanche Springs, New Braunfels, etc., *Lindheimer* 926 (F, GH, MEX, NY, PH, TEX, UC, US); Dallas Co.: Dallas, *Barr* 23 (SMU); Denton Co.: Lake Dallas Dam, *McCart* 604 (SMU, TEX); Donley Co.: Hedley, *Martin* 2901 (US); Fayette Co.: Muldoon, *Ripple* 51-728 (TEX); Floyd Co.: Plainview, *Ferris & Cundan* 3370 (NY); Freestone Co.: 13 mi. s. Fairfield, *Shinners* 12941 (SMU); Galveston Co.: Texas City, *Turner* 1733 (SMU); Goliad Co.: Goliad, *Williams* 85 (PH); Gregg Co.: Longview, *Shinners* 16227 (SMU); Grimes Co.: Plantersville, *Stoneham* (US); Guadalupe Co.: Sequin, *Groth* 197 (CU, F, GH, US); Harris Co.:

Houston, *Anderson* 36-4 (TEX); Harrison Co.: 11 mi. s. w. Marshall, *Steyermark* 52293 (F); Henderson Co.: 2.5 mi. s. e. Eustace, *Shinners* 9592 (SMU); Hidalgo Co.: 7 mi. w. Mission, *Uzzell* 25 (TEX); Hill Co.: 3.6 mi. s. w. Hinton, *Shinners* 12069 (SMU); Hood Co.: 5.5 mi. n. e. Granbury, *Shinners* 10332 (SMU); Hopkins Co.: Pierton, *Whitehouse* 17569 (SMU); Hutchinson Co.: 3 mi. n. Stinnett, *Cory* 50326 (SMU); Jackson Co.: 3 mi. s. Vanderbilt, *Tharp & Barkley* 13A159 (F, PH, TEX); Jasper Co.: 2.5 mi. s. Jasper, *Shinners* 25138 (SMU); Johnson Co.: Cleburne State Park, *Cory* 58000 (SMU); Karnes Co.: 2 mi. s. Karnes City, *Johnson* 1009 (SMU, TEX); Kaufman Co.: Terrell, *Shinners* 10838 (SMU); Kenedy Co.: 3.4 mi. s. Armstrong, *Shinners* 17093 (SMU); Knox Co.: 1 mi. n. Goree, *Sumanth* 266 (SMU); La Salle Co.: 10.2 mi. n. w. Cotulla, *Shinners* 17301 (SMU); Leon Co.: 23 mi. s. w. Buffalo, *Shinners* 7138 (SMU); Liberty Co.: 2.8 mi. s. w. Cleveland, *Shinners* 25306 (SMU); Limestone Co.: Tehuacana, *Miles* (SMU); Live Oak Co.: 7 mi. w. Three Rivers, *Shinners* 16984 (SMU); Llano Co.: *Whitehouse* (TEX); Lubbock Co.: Lubbock, *Reed* 3942 (CU, TEX, US); McLennan Co.: Gaphead Road, *Smith* 76 (TEX); Montague Co.: 1.3 mi. w. Barnie, *Storm* 1123 (SMU); Montgomery Co.: 3 mi. n. w. Conroe, *Shinners* 16538 (SMU); Nacogdoches Co.: 4.7 mi. e. Douglas, *Shinners* 24883 (SMU); Palo Pinto Co.: 6 mi. w. Palo Pinto, *Anderson & Harty* 25 (SMU); Panola Co.: 9 mi. s. Carthage, *Shinners* 6703 (SMU); Parker Co.: 1.4 mi. s. s. w. Springtown, *Shinners* 16420 (SMU); Presidio Co.: 8 mi. e. Presidio, *Hinckley* 1303 (NY, SMU); Red River Co.: 16.2 mi. n. Clarksville, *Whitehouse* 20573 (SMU); Robertson Co.: 7 mi. n. e. Hearne, *Shinners* 7144 (SMU); San Patricio Co.: 7.5 mi. w. Taft, *Jones* 420 (OKLA, SMU); San Saba Co.: 3 mi. s. e. San Saba, *Cory* 58285 (SMU); Smith Co.: 1 mi. e. Troup, *Cory* 55576 (SMU); Titus Co.: Talco School, *Cato* 6481 (TEX); Travis Co.: Austin, *Waldorf* (NY, TEX, UC); Val Verde Co.: Del Rio, *Warnock* 853 (CU, TEX); Van Zandt Co.: Willa Point, *Stewart* 165 (SMU); Walker Co.: Huntsville, *Whitehouse* 6649 (TEX); Waller Co.: Hempstead, *Lundell & Lundell* 11019 (SMU); Wise Co.: 12.7 mi. w. Rhome, *Whitehouse* 19221 (SMU); Young Co.: 3 mi. s. w. Newcastle, *Woolfolk* 8 (SMU). **New Mexico:** Quay Co.: Nara Visa, *Fisher* 49 (US). **Arizona:** Cochise Co.: *Shinners* 17392 (SMU); Maricopa Co.: Salt River, *Butler* 48 (TEX); Pima Co.: Tucson, *Wiggins* 6228 (US). **MEXICO:** Nuevo León: Monterrey, *Kenoyer* 1094 (SMU). Coahuila: Saltillo, *Fisher* 4 (F). Sonora: Hermosillo, *Rose*, *Standley & Russell* 12497 (NY, US). Sinaloa: Fuerte, *Rose*, *Standley & Russell* 13437 (US). **BRAZIL:** Rio Grand de Sul: Porto Alegre, *Renick* (GH).

7b. *H. latifolia* var. *macgregoris* var. nov.

Folia oblongo-lanceolata, remote serrata, in ambitu pilosa. Involucra plus quam 0.9 cm. lata.

Leaves oblong-lanceolate, remotely serrate, upper and lower leaf surfaces pilose. Involucres more than 0.9 cm. in width.

TIME OF FLOWERING: July to October.

TYPE AND TYPE LOCALITY: *R. L. McGregor* 5163, dry sandy prairie,

Morton County, Kansas. Deposited in the Herbarium of the University of Kansas (KANU).

DISTRIBUTION AND HABITATS: Kansas, Oklahoma, northern Texas, southeastern Colorado, New Mexico, and Arizona; introduced to New York; New Jersey and Delaware. Sandy soils along streams, in prairies, overgrazed pastures and roadsides, at altitudes of 800 to 1,500 feet.

It gives me great pleasure to name this variety in honor of Professor R. L. McGregor, whose counsel and guidance were of inestimable value in connection with the present study.

Representative specimens. New York: Suffolk Co.: La Guardia Field, *Uttal* (NY). New Jersey: Cumberland Co.: 1 mi. n. Leesburg, *Blake* 11958 (GH, US). Delaware: Sussex Co.: Slaughter Beach, *Larsen* 1080 (PH). Illinois: Henry Co.: Sect. 7, Edford Township, *Dobbs* (GH). Kansas: Barber Co.: 6 mi. n. Medicine Lodge, *Wagenknecht* 4617 (KANU); Barton Co.: 6 mi. s. w. Great Bend, *Wagenknecht* 4585 (KANU); Clark Co.: 4 mi. w. Ashland, *Wagenknecht* 4677 (KANU); Comanche Co.: 1 mi. s. Coldwater, *Wagenknecht* 4640 (KANU); Douglas Co.: *McGregor* 359 (KANU); Finney Co.: *Kellerman* (PH); Harper Co.: 2 mi. e. Harper, *McGregor* 13752 (KANU); Kiowa Co.: 3 mi. w. Greenburgh, *McGregor* 4040 (KANU); Meade Co.: Meade Co. State Park, *Horr* 3686 (KANU); Morton Co.: 9 mi. n. Elkhart, *McGregor* 5163 (KANU); Ottawa Co.: 3 mi. s. Minneapolis, *Horr* E585 (KANU, OKLA, SMU, UC, US); Reno Co.: Medora sand dunes, *Gates* 21911 (TEX, US); Rice Co.: 3 mi. e. Raymond, *Wagenknecht* 4419 (KANU); Rooks Co.: Rockport, *Bartholomew* (NY); Saline Co.: Brookville, *Gates* 20619 (F, NY, PH); Sedgwick Co.: near Wichita, *Branch* 78 (CU); Seward Co.: 25 mi. s. w. Meade, *Fearing & Latham* (US); Stafford Co.: 8 mi. n. e. Hudson, *McGregor* 13694 (KANU). Oklahoma: Beckham Co.: Red River, *Eskew* 1515 (PH); Caddo Co.: 3 mi. w. Andarko, *Nelson, Nelson & Hopkins* 894 (UC); Cleveland Co.: 4 mi. w. Norman, *Nelson, Nelson & Hopkins* 748 (OKLA, SMU); Comanche Co.: Fort Sill, *Clemens* 11,810 (GH, NY); Custer Co.: Weatherford, *Waterfall* 751 (GH, NY); Ellis Co.: 4.5 mi. s. Arnett, *Nelson, Nelson & Goodman* 5335 (SMU, TEX); Kay Co.: *Keyser* 6082 (NY); Pawnee Co.: Cleveland, *Palmer* 6383 (CU, US); Payne Co.: 1 mi. s. Perkins, *Atkins* 35 (SMU); Woods Co.: Alva, *Stevens* 2841 (GH, US); Woodward Co.: *Lock* 47 (US). Texas: Bailey Co.: Coyote Lake, *Ferris & Duncan* 3441 (NY); Clay Co.: Henrietta, *Whitehouse* 10832 (SMU); Coke Co.: *Cory* 5303 (GH); Hardeman Co.: 7.2 mi. n. Quansh, *Whitehouse* 10755 (SMU); Hemphill Co.: *Carleton* 538 (F, NEB, US); Mitchell Co.: Colorado City, *Pohl* 4300 (SMU); Taylor Co.: *Tolstead* 7526 (SMU, TEX, UC); Ward Co.: *Pennell* 19357 (PH); Wheeler Co.: 3.5 mi. n. Shamrock, *Cory* 50244 (SMU); Winkler Co.: 2 mi. n. Winkler, *Warnock & Parks* 8799 (SMU). Colorado: Baca Co.: Sandy flats, Cimarron River, *Weber* 5165 (SMU). New Mexico: Eddy Co.: 5 mi. n. e. Carlsbad, *Albers* 46292 (TEX); Chavez Co.: 7 mi. n. e. Boaz, *Waterfall* 4322 (GH). Arizona: Pima Co.: Tucson, *Ginter*, (US).

7c. *H. latifolia* var. *arkansana* var. nov.

Folia ovata vel lanceolata, serrata, in ambitu pilosa, rami laterales divaricati.

Leaves ovate to lanceolate, coarsely serrate, upper and lower surfaces pilose. Lateral branches widely spreading.

TIME OF FLOWERING: July to November.

TYPE AND TYPE LOCALITY: *D. M. Moore* 30142, Magazine Mountain, Logan County, Arkansas. Deposited in the Herbarium of the University of Texas (TEX).

DISTRIBUTION AND HABITS: Southern Missouri, Arkansas, eastern Oklahoma, eastern Texas, and introduced to Maryland. Sandy or rocky ground in pastures and along roadsides at altitudes of 600 to 2,000 feet.

Representative specimens. Maryland: Wicomico Co.: Quantico, *Tidestrom* 7417 (US). Missouri: Butler Co.: Batesville, *Steyermark* 74503 (F); St. Louis Co.: St. Louis, *Muhlenback* 756 (F). Arkansas: Desha Co.: Fayetteville, *Moore* 480643 (TEX); Jefferson Co.: Pine Bluff, *Demaree* 16243 (F); Montgomery Co.: Caddo River bottoms, *Demaree* 9585 (NY); Pike Co.: Little Missouri River bottoms, *Demaree* 9678 (NY); Pulaski Co.: Little Rock, *Demaree* 22362 (NY, UC). Oklahoma: Cherokee Co.: 6.7 mi. n. e. Tahlequah, *Wallis* 5981 (SMU). Texas: Bowie Co.: Texarkana, *Heller & Heller* 4092 (CU, F, GH, NEB, NY, PH, TEX, UC, US).

EXCLUDED SPECIES

Heterotheca deltoidea Klatt. Ann. K. K. Natur. Hoff. 9: 258. 1894.

An examination of a fragment of the type (F) and photographs of the type (F, US), prove this species to be a member of a genus not known to the author.

Heterotheca grievii Benson. Bot. Gaz. 74(2): 121. 1922.

This species is a microsporangiate organ genus attributed to *Heterangium grievii*, a paleobotanical genus of Lower Carboniferous Pteridosperm Stems, and not a member of the group under investigation.

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THIRTEENTH REPORT OF THE COMMITTEE
ON PLANT DISTRIBUTION

The twelfth report included the Dicotyledoneae through Aizoaceae. The present report deals with the families from Portulaceae through Lauraceae, taken in the order of the eighth edition of Gray's manual.

The data for these reports have been compiled from the herbarium of the New England Botanical Club and the Gray Herbarium.

PRELIMINARY LISTS OF NEW ENGLAND PLANTS—XXXVIII

The sign + indicates that an herbarium specimen has been seen, the sign — that a reliable printed record has been found and the sign * is used for those plants which are not native in the New England area.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
POTULACACEAE						
Claytonia caroliniana Michx.	+	+	+	+	+	+
Claytonia virginica L.	—	—	—	+	+	+
Montia lamprosperma Cham.	+					
*Montia perfoliata (Donn.) Howell			+			
*Montia sibirica (L.) Howell				+		
*Portulaca grandiflora Hook.			+	+	+	+
*Portulaca oleracea L.	+	+	+	+	+	+
CARYOPHYLLACEAE						
*Agrostemma Githago L.	+	+	+	+	+	+
Arenaria caroliniana Walt.						+
Arenaria groenlandica (Retz.) Spreng.	+	+	+			
Arenaria groenlandica var. glabra (Michx.) Fern.						
Arenaria lateriflora L.	+	+		—	+	+
Arenaria macrophylla Hook.	+	+	+	+	+	+
Arenaria peploides L. var. robusta Fern.	+	+		+	+	+
Arenaria rubella (Wahlenb.) Small			+			
*Arenaria serpyllifolia L.	+	+	+	+	+	+
*Arenaria serpyllifolia var. tenuior Mert. & Koch	+	+	+	+		+
Arenaria stricta Michx.		+	+	+		+
Cerastium arvense L.	+	+	+	+	—	+
Cerastium nutans Raf.			+	+		+
*Cerastium semidecandrum L.				+	+	+
*Cerastium viscosum L.				—	+	+
*Cerastium vulgatum L.	+	+	+	+	+	+
*Cerastium vulgatum f. glandulosum (Boenn.) Druce				+		
*Dianthus Armeria L.	+	+	+	+	+	+
*Dianthus barbatus L.	+	+	+	+	+	+
*Dianthus deltoides L.	+	+	+	+		+
*Dianthus plumarius L.	+	+	+	+		—
*Gypsophila elegans Bieb.	+	+	+	+		+
*Gypsophila muralis L.	+	+	+	+		+
*Gypsophila paniculata L.	+	+	+	+	+	+
*Hernaria glabra L.	—		+			+
*Holosteum umbellatum L.	+			+	+	+
*Lychnis alba Mill.	+	+	+	+	+	+
*Lychnis chalcedonica L.	+	+	+	+		+
*Lychnis coronaria (L.) Desr.	+	+	+	+	+	+

	Me.	N.	H.	Vt.	Mass.	R.	I.	Conn.
* <i>Lychnis dioica</i> L.	+	+	+	+	+	+	+	+
* <i>Lychnis Flos-cuculi</i> L.	+	+	+	+	+	+	+	+
* <i>Lychnis Viscaria</i> L.	+	+		+				+
* <i>Myosoton aquaticum</i> (L.) Moench				+	+			+
<i>Paronychia argyrocoma</i> (Michx.) Nutt. var. albimontana Fern.	+	+		+				
<i>Paronychia canadensis</i> (L.) Wood		+	+	+	+	+	+	+
<i>Paronychia fastigiata</i> (Raf.) Fern.					+	—	+	+
<i>Sagina decumbens</i> (Ell.) T. & G.				+	+			+
<i>Sagina nodosa</i> (L.) Fenzl	+							
<i>Sagina nodosa</i> var. <i>pubescens</i> Mert. & Koch	+			+				
<i>Sagina procumbens</i> L.	+	+	+	+	+	+	+	+
* <i>Saponaria ocyoides</i> L.					+			
* <i>Saponaria officinalis</i> L.	+	+	+	+	+	+	+	+
* <i>Saponaria Vaccaria</i> L.	+	+	+	+	+	+	+	+
* <i>Scleranthus annuus</i> L.	+	+		+	+	+	+	+
<i>Silene acaulis</i> L. var. <i>escapa</i> (All.) DC	+	+						
<i>Silene antirrhina</i> L.	+	+	+	+	+	+	+	+
<i>Silene antirrhina</i> f. <i>apetala</i> Farw.	+	+		+		—	+	+
<i>Silene antirrhina</i> f. <i>Deaneana</i> Fern.	—			+		+	+	+
* <i>Silene Armeria</i> L.	+	+	+	+	+	+	+	+
<i>Silene caroliniana</i> Walt. var. <i>pensylvanica</i> (Michx.) Fern.	—			+	+	+	+	+
* <i>Silene conica</i> L.					+			
* <i>Silene Cerei</i> Baumg.	+	+	+	+	+	+	+	+
* <i>Silene Cucubalus</i> Wibel	+	+	+		+	+	+	+
* <i>Silene dichotoma</i> Ehrh.	+	+	+	+				
* <i>Silene gallica</i> L.	+	+	+					
* <i>Silene nivea</i> (Nutt.) Oth.	+							
* <i>Silene noctiflora</i> L.	+	+	+	+	+	+	+	+
* <i>Silene nutans</i> L.	+							
* <i>Silene pendula</i> L.	+							
<i>Silene stellata</i> (L.) Ait. f.				+	—	+	+	+
* <i>Spergula arvensis</i> L.	+	+	+	+	+	+	+	+
* <i>Spergula arvensis</i> var. <i>sativa</i> (Boenn.) Reichenb.			+					
<i>Spergularia canadensis</i> (Pers.) Don	+	+		+	+	+	+	+
<i>Spergularia marina</i> (L.) Griseb.	+	+		+	+	+	+	+
<i>Spergularia marina</i> var. <i>leiosperma</i> (Kindb.) Gurke								
* <i>Spergularia rubra</i> (L.) J. & C. Presl.	+	+	+	+	+	+	+	+
<i>Stellaria Alaine</i> Grimm	+	+	+	+				
<i>Stellaria calycantha</i> (Ledeb.) Bong.	+	+	+					+
<i>Stellaria calycantha</i> var. <i>floribunda</i> Fern.	+	+	+	+				+
<i>Stellaria calycantha</i> var. <i>isophylla</i> Fern.	+	+	+	+				+
* <i>Stellaria graminea</i> L.	+	+	+	+	+	+	+	+
* <i>Stellaria Holostea</i> L.					+			
<i>Stellaria humifusa</i> Ehrh.	+							
<i>Stellaria longifolia</i> Muhl.	+	+	+	+	+	+	+	+
* <i>Stellaria media</i> (L.) Cyrillo.	+	+	+	+	+	+	+	+
<i>Stellaria pubera</i> Michx.				+				
<i>Stellaria pubera</i> var. <i>silvatica</i> (Beguinot) Weath.								+
* <i>Tunica Saxifraga</i> (L.) Scop.				—	+			
CERATOPHYLLACEAE								
<i>Ceratophyllum demersum</i> L.	+	+	+	+	+	+	+	+
<i>Ceratophyllum echinatum</i> Gray	+		+	+	+	+	+	+
NYMPHARACEAE								
<i>Brasenia Schreberi</i> Gmel.	+	+	+	+	+	+	+	+
* <i>Cabomba caroliniana</i> Gray	+	—		+				+
* <i>Nelumbo lutea</i> (Willd.) Pers.				—	+			+
<i>Nuphar advena</i> (Ait.) Ait. f.	+						—	

	Me.	N.	H.	Vt.	Mass.	R.	I.	Conn.
<i>Nuphar microphyllum</i> (Pers.) Fern.	+	+	+	+	+	+	+	
<i>x Nuphar rubrodiscum</i> Morong	+	+	+	+	+	+	+	-
<i>Nuphar variegatum</i> Engelm.	+	+	+	+	+	+	+	
<i>Nymphaea odorata</i> Ait.	+	+	+	+	+	+	+	
<i>Nymphaea odorata</i> var. <i>giganten</i> Tricker						+	-	
<i>Nymphaea odorata</i> f. <i>rubra</i> Guillon	+	+			+			
<i>Nymphaea tetragona</i> Georgi	+							
<i>Nymphaea tuberosa</i> Paine				+				+
RANUNCULACEAE								
<i>*Aconitum Napellus</i> L.	+	+	+	+	+	+	+	-
<i>Actaea pachypoda</i> Ell.	+	+	+	+	+	+	+	
<i>Actaea pachypoda</i> f. <i>rubrocarpa</i> (Killip) Fern.	+	+	-	+	+	+	+	
<i>Actaea rubra</i> (Ait.) Willd.	+	+	+	+	+	+	+	
<i>Actaea rubra</i> f. <i>neglecta</i> (Gillman) Robins.	+	+	+	+	+	+	+	
<i>Anemone canadensis</i> L.	+	+	+	+	+	+	+	
<i>Anemone cylindrica</i> Gray	+	+	+	+	+	+	+	
<i>Anemone multifida</i> Poir.	+		+					
<i>*Anemone nemorosa</i> Lam.					+			
<i>Anemone quinquefolia</i> L.	+	+	+	+	+	+	+	
<i>Anemone riparia</i> Fern.	+	+	+	+	+	+	+	
<i>Anemone virginiana</i> L.	+	+	+	+	+	+	+	
<i>Anemone virginiana</i> f. <i>leucosepala</i> Fern.	-	+	+	+	+	+	+	
<i>Anemonella thalictroides</i> (L.) Spach	+	+	+	+	+	+	+	
<i>Aquilegia canadensis</i> L.	+	+	+	+	+	+	+	
<i>Aquilegia canadensis</i> var. <i>coccinea</i> (Small) Munz	+							
<i>Aquilegia canadensis</i> var. <i>flaviflora</i> (Tenney) Britt.						+		+
<i>Aquilegia canadensis</i> f. <i>Phippenii</i> (J. Robinson) H. Hoffm.	+				+			-
<i>*Aquilegia vulgaris</i> L.	+	+	+	+	+	+	+	
<i>Caltha palustris</i> L.	+	+	+	+	+	+	+	
<i>Cimicifuga racemosa</i> (L.) Nutt.	+	+	-		+			
<i>Cimicifuga racemosa</i> f. <i>dissecta</i> (Gray) Fern.								+
<i>*Clematis dioscoreifolia</i> Levl. & Vaniot var. <i>robusta</i> (Carr.) Rehd.					+			+
<i>Clematis verticillaris</i> DC.	+	+	+	+	+	+	+	
<i>Clematis virginiana</i> L.	+	+	+	+	+	+	+	
<i>Coptis groenlandica</i> (Oeder) Fern.	+	+	+	+	+	+	+	
<i>*Delphinium Ajacis</i> L.				-	+	+	+	
<i>*Delphinium consolida</i> L.						+		-
<i>Hepatica acutiloba</i> DC.	+	+	+	+	+	+	+	
<i>Hepatica americana</i> (DC.) Ker	+	+	+	+	+	+	+	
<i>Hydrastis canadensis</i> L.				+				+
<i>*Nigella damascena</i> L.						+		
<i>Ranunculus abortivus</i> L.	+	+	+	+	+	+	+	
<i>Ranunculus abortivus</i> var. <i>acerolasius</i> Fern.	+	+	+	+	+	+	+	
<i>Ranunculus abortivus</i> var. <i>eucyclus</i> Fern.	+	+	+	+	+	+	+	
<i>*Ranunculus acris</i> L.	+	+	+	+	+	+	+	
<i>*Ranunculus acris</i> var. <i>latisectus</i> G. Beck	+	+	+	+	+	+	+	
<i>Ranunculus allegheniensis</i> Britt.		-		+	+	+	+	
<i>Ranunculus ambigens</i> S. Wats.	+	+	+	+	+	+	+	
<i>*Ranunculus bulbosus</i> L.	+	+	+	+	+	+	+	
<i>*Ranunculus bulbosus</i> var. <i>dissectus</i> Babey	+	+	+	+	+	+	+	
<i>*Ranunculus bulbosus</i> var. <i>valdepubens</i> (Jord.) Briq.						+	+	
<i>Ranunculus Cymbalaria</i> Pursh	+	+			+	+	+	-
<i>Ranunculus fascicularis</i> Muhl.	+	-						+
<i>*Ranunculus Ficaria</i> L.					+			

The Portulacaceae and the Caryophyllaceae were treated by B. L. Robinson in 1902 (Rhodora V-188 and 235) and the Ranunculaceae by C. A. Weatherby, C. H. Knowlton and W. S. Ripley Jr. in 1918 (Rhodora XX-182 and 193). In the years since these previous reports were published more specimens have come into the herbaria. Also there have appeared plant lists for three of the New England States: "The Flora of Vermont" in 1937, "Check-List of the Vascular Plants of Maine" in 1948 and "The Flora of Rhode Island" in 1952.

In general the introduced plants have tended to spread during the intervening years. The native species in many cases show the same distribution as in the earlier reports. Some of the exceptions are here listed.

Arenaria caroliniana, a coastal plain species previously unreported, has now been collected in Weekapaug and Westerly, Rhode Island. *Ranunculus lapponicus* was collected by G. D. Chamberlain in 1939 in Mapleton, Maine and was seen in other localities in the Aroostook River Basin, the first stations for this species in New England. *Actaea pachypoda* forma *rubrocarpa* and *Ranunculus abortivus* var. *acrolasius* were not recognized until after 1918.

Cerastium nutans, *Ranunculus longirostris* and *R. subrigidus*, formerly known from western Vermont and Connecticut, have now been collected in western Massachusetts. *Arenaria macrophylla*, reported from Vermont only, has now been found in Massachusetts and Connecticut.

Silene acaulis var. *exscapa* has been collected on Mt. Katahdin, Maine as well as in the White Mountains. *Silene stellata*, previously known from Rhode Island and Connecticut, is now represented by a specimen from Windsor, Vermont.

The geographical areas are the same as used in the previous reports. It is interesting to note that in spite of the large number of species and varieties represented, there are only four that can be considered as generally distributed. Here again a large number of the plants included are not native to New England but the percentage is not so great as in the previous report; only forty percent of the plants are introduced. Because of this the various subgroups in

this latter category are used as in the previous report.

I. GENERALLY DISTRIBUTED. — *Arenaria lateriflora*, *Nuphar variegatum*, *Clematis virginiana*, *Thalictrum polygamum*.

IA. GENERAL, EXCEPT THE COAST OF WASHINGTON COUNTY, MAINE. — *Cerastium arvense*, *Ceratophyllum demersum*, *C. echinatum*, *Brasenia Schreberi*, *Nymphaea odorata*, *Actaea rubra*, *Anemone quinquefolia*, *Ranunculus recurvatus*.

Ceratophyllum echinatum is very local. There are only three widely scattered stations in Maine and none in Vermont or Rhode Island. *Brasenia Schreberi* has only one station north of 45° , at Portage Lake, Maine. While *Nymphaea odorata* fits this category, *N. odorata* var. *gigantea* has only six stations, three in Essex County, Massachusetts, two in Barnstable County, Massachusetts and one on Block Island, Rhode Island. *Actaea rubra* is not recorded from Cape Cod east of Sandwich.

IB. GENERAL, EXCEPT CAPE COD. — *Stellaria calycantha* and vars. *floribunda* and *isophylla*, *Actaea pachypoda*, *Coptis groenlandica*, *Ranunculus abortivus* var. *acrolasius*, *R. pensylvanicus*, *R. trichophyllum* and var. *calvescens*.

Stellaria calycantha itself is infrequent; var. *floribunda* is not found in Rhode Island and has only four stations in Vermont.

IC. GENERAL, EXCEPT CAPE COD AND THE MAINE COAST EAST OF THE KENNEBEC RIVER. — *Nuphar rubrodiscum*, *Caltha palustris*, *Ranunculus septentrionalis*, *Caulophyllum thalictroides*. *Ranunculus septentrionalis*, is not found in Massachusetts east of the Connecticut valley nor in Rhode Island.

ID. GENERAL, EXCEPT CAPE COD AND WASHINGTON COUNTY, MAINE. — *Claytonia caroliniana*, *Stellaria longifolia*, *Nuphar micropodium*, *Ranunculus abortivus* var. *eucyclus*. Both *Claytonia caroliniana* and *Stellaria longifolia* are rare in northern Maine with one station each in that area.

II. NORTHERN — NUMEROUS STATIONS SOUTH OF 43° . — *Stellaria Alsine*, *Ranunculus reptans* and var. *ovalis*, *Thalictrum polygamum* var. *hebecarpum*.

Stellaria Alsine is not found in northern Maine. *Thalictrum polygamum* var. *hebecarpum* apparently is absent from Rhode Island and Connecticut.

III. ALPINE-ARCTIC. — *Montia lamprosperma*, *Sagina nodosa* and var. *pubescens*, *Arenaria groenlandica* and var. *glabra*, *Silene acaulis* var. *escapa*, *Paronychia argyrocoma* var. *albimontana*, *Stellaria humifusa*.

Silene acaulis var. *escapa* is strictly alpine. *Stellaria humifusa* is arctic coming into New England along the eastern Maine coast as far as Hancock County.

IVa. CAPE COD, BUT NOT NORTHERN MAINE-GENERAL IN MAINE SOUTH OF 45° . — *Sagina procumbens*, *Silene antirrhina*, *Anemone cylindrica*. *Anemone cylindrica* apparently occurs in Maine only in the south western part.

IVb. CAPE COD, BUT NOT NORTHERN MAINE-NOT ON MAINE COAST EAST OF THE KENNEBEC RIVER. — *Ranunculus abortivus*.

IVc. CAPE COD, BUT NOT NORTHERN MAINE-SOME NORTH OF 45°, BUT NOT IN WASHINGTON COUNTY. — *Anemone virginiana*, *Aquilegia canadensis*.

Aquilegia canadensis var. *coccinea* is reported only from Troy, New Hampshire and North Guilford, Connecticut.

V. NEITHER CAPE COD NOR NORTHERN MAINE AND NOT IN WASHINGTON COUNTY. — *Hepatica americana*, *Ranunculus flabellaris*, *Thalictrum dioicum*.

VIA. CHIEFLY THE THREE SOUTHERN STATES, BOTH CAPE COD AND WESTERN MASSACHUSETTS. — *Ranunculus sceleratus*, *Thalictrum revolutum*, *Lindera Benzoin*, *Sassafras albidum* and var. *molle*. Except for four stations, *Ranunculus sceleratus* seems to be confined to the coastal area.

VIB. CHIEFLY THE THREE SOUTHERN STATES, CAPE COD BUT NOT WESTERN MASSACHUSETTS. — *Ranunculus ambigens*. This species is mainly coastal but is frequent in the Connecticut valley.

VIC. CHIEFLY THE THREE SOUTHERN STATES, WESTERN MASSACHUSETTS BUT NOT CAPE COD. — *Paronychia canadensis*, *Silene caroliniana* var. *pensylvanica*, *Anemonella thalictroides*, *Ranunculus fascicularis*, *Liriodendron Tulipifera*. The only station reported for *Silene caroliniana* var. *pensylvanica* in western Massachusetts is in the town of Mt. Washington. *Ranunculus fascicularis* prefers the trap ridges.

VID. CHIEFLY THE THREE SOUTHERN STATES, NEITHER CAPE COD NOR WESTERN MASSACHUSETTS. — *Paronychia fastigiata*, *Sagina decumbens*, *Ranunculus micranthus* var. *delitescens*. *Paronychia fastigiata* is confined to the Connecticut valley and eastern Massachusetts. *Ranunculus micranthus* var. *delitescens* is another species that prefers the trap ridges.

VIE. SOUTHWESTERN NEW ENGLAND CHIEFLY. — *Claytonia virginica*, *Silene stellata*, *Cimicifuga racemosa*, *Ranunculus hispidus* and var. *falsus*.

Silene stellata has one station at Windsor in eastern Vermont. The stations of *Cimicifuga racemosa* at North Berwick, Maine and Enfield, New Hampshire are evidently introduced. *Ranunculus hispidus* var. *falsus* has one outlying station at Bethel in central Vermont.

VII. COASTAL PLAIN. — *Arenaria caroliniana*, *Magnolia virginiana*, *Arenaria caroliniana* has two stations only at Weekapaug and Westerly, Rhode Island. *Magnolia virginiana* has two stations close together in eastern Essex County, Massachusetts.

VIII. CALCICOLOUS — CHIEFLY WEST OF THE CONNECTICUT RIVER IN THE SOUTH, IF IN EAST MOSTLY NORTH OF 45°. — *Arenaria stricta*, *Anemone canadensis*, *A. multifida*, *A. riparia*, *Clematis verticillaris*, *Ranunculus allegheniensis*, *R. longirostris*, *R. subrigidus*, *Thalictrum confine*. *Arenaria stricta* has a few stations in central New Hampshire. *Anemone canadensis* is evidently an introduction at the numerous stations in eastern Massachusetts. *Clematis verticillaris* is widely distributed,

chiefly away from the coast, but nowhere common. *Ranunculus allegheniensis* occurs in the calcareous areas of western New England and is frequent in eastern Massachusetts where there are basic rocks.

IX. WESTERN NEW ENGLAND CHIEFLY. — *Arenaria macrophylla*, *Cerastium nutans*, *Nymphaea tuberosa*, *Hepatica acutiloba*, *Hydrastis canadensis*, *Trollius laxus*, *Podophyllum peltatum*, *Menispermum canadense*.

Hepatica acutiloba extends sparingly eastward on sweet soils. It might well be included in the list of calcicolous plants. *Hydrastis canadensis* is very rare with stations at Shelburne and Weybridge, Vermont and Plainville and Southington, Connecticut. *Trollius laxus* is even more local and is apparently confined to northwestern Connecticut at Cornwall, West Cornwall and Canaan.

X. MARITIME HALOPHYTE — IN VICINITY OF COAST, NO ISLAND STATIONS. — *Arenaria peploides* var. *robusta*, *Spergularia marina* and var. *leiosperma*, *S. canadensis*, *Ranunculus Cymbalaria*.

XI. ESTUARINE. — *Nuphar advena*. This species is found at Merry-meeting Bay in Maine and in southwestern Connecticut.

XII. INTRODUCED SPECIES — GENERAL. — *Agrostema Githago*, *Arenaria serpyllifolia*, and its var. *tenuior*, *Cerastium vulgatum*, *Dianthus barbatus*, *Lychnis alba*, *L. dioica*, *Saponaria officinalis*, *S. Vaccaria*, *Silene Cucubalus*, *S. noctiflora*, *Spergula arvensis*, *Spergularia rubra*, *Stellaria graminea*, *S. media*, *Ranunculus acris*, *R. bulbosus*, *R. repens* and var. *glabratus*, *Berberis Thunbergii*, *B. vulgaris*.

Four members of this group have not been reported north of 45°: *Lychnis alba*, *Saponaria officinalis*, *Ranunculus bulbosus* and *R. repens*; *Berberis vulgaris* has only one station north of 45°.

XIIa. INTRODUCED SPECIES — NEITHER CAPE COD NOR NORTHERN MAINE. — *Lychnis chalcedonica*, *L. Flos-cuculi*.

XIIb. INTRODUCED SPECIES WITH NORTHERN TENDENCIES. — *Aquilegia vulgaris*.

XIIc. INTRODUCED SPECIES WITH SOUTHERN TENDENCIES, CHIEFLY SOUTH OF 43°. — *Portulaca grandiflora*, *P. oleracea*, *Cerastium semidecandrum*, *Dianthus Armeria*, *D. deltoides*, *Lychnis Coronaria*, *Scleranthus annuus*, *Silene Armeria*, *S. dichotoma*, *Cabomba caroliniana*, *Delphinium Ajacis*.

XIID. INTRODUCED SPECIES — SPORADIC. — *Dianthus plumarius*, *Gypsophila elegans*, *G. muralis*, *G. paniculata*, *Myosoton aquaticum*, *Silene gallica*, *Aconitum Napellus*, *Ranunculus acris* var. *latisectus*, *R. repens* var. *erectus*, var. *linearilobus*, var. *pleniflorus*, var. *villosum*.

XIIe. INTRODUCED SPECIES — LOCAL. — *Cerastium viscosum*, *Holosteum umbellatum*, *Lychnis Viscaria*, *Silene conica*, *S. Cerei*, *Tunica Sazifraga*, *Nelumbo lutea*, *Nigella damascena*, *Ranunculus Ficaria*, *Xanthorrhiza simplicissima*, *Akebia quinata*, *Magnolia acuminata*, *M. tripetala*.

The following local plants are represented by only one station in New England and it is doubtful if they should be considered as a real part of our flora: *Calandrinia caulescens* var. *Menziesii* collected at

Seekonk, Massachusetts; *Montia perfoliata* at Jefferson, New Hampshire; *Montia sibirica* at Manchester, Massachusetts; *Herniaria glabra* at Bangor, Maine; *Saponaria ocymoides* at Lexington, Massachusetts; *Silene nivea* at Orono, Maine; *S. nutans* at Bar Harbor, Maine; *S. pendula* at Strong, Maine; *Anemone nemorosa* at Danvers, Massachusetts; *Delphinium consolida* at Providence, Rhode Island; *Calycanthus fertilis* at Seymour, Connecticut.

XIII. MISCELLANEOUS.—*Arenaria rubella*, *Stellaria pubera*, *Nymphaea tetragona*, *Ranunculus Gmelini* var. *Hookeri*, *Thalictrum dasycarpum*, *T. polygamum* var. *intermedium*. *Arenaria rubella* is found in New England only at Smuggler's Notch, Vermont. *Stellaria pubera* with a normal range from New Jersey to Illinois southward is recorded from Bethel, Vermont, but questionably so because of insufficient data. Its var. *sylvatica* is probably introduced at its two stations at Norwalk and Wilton, Connecticut. *Nymphaea tetragona* is represented by only three stations, Attean, Perham and Portage Lake, all in Maine. *Ranunculus Gmelini* var. *Hookeri* is a boreal plant found at Presque Isle and New Limerick in Aroostook County, Maine. *Thalictrum dasycarpum* is also outside its normal range and is probably an escape from cultivation at its five known stations in southwestern New England. *Thalictrum polygamum* var. *intermedium* has only two stations in New England—Bristol, Rhode Island and Franklin, Connecticut.—

R. C. BEAN, A. F. HILL, AND R. J. EATON.

A NEW FORM OF ASTRAGALUS MOLLISSIMUS.—

Astragalus mollissimus Torr., the woolly locoweed, is of frequent occurrence in the western half of Kansas as evidenced by the fact that herbarium specimens exist from each county of the area. The species grows in a wide variety of habitats but is most abundant on rocky, gravelly, prairie hillsides. Of the thousands of specimens observed by me all have had rose-purple to bright purple corollas except for a small colony in Barber County, Kansas, which have yellow corollas. This character has been observed through two seasons. In all other respects the plants are like the species. The yellow-flowered plants may be described as: *Astragalus mollissimus* Torr., forma *flavus* McGregor, forma nov. Ad formam typicam similis, sed petalis flavis. T32S, R14W, Sec. 20, Gypsum Hills prairie, Barber County, Kansas, April 25, 1959, McGregor 14186 (Type, KANU.) — RONALD L. MCGREGOR, UNIVERSITY OF KANSAS, LAWRENCE.

